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(56) Documents Cited

**GB 2327795 A**

**WO 91/07734 A**

**GB 2278221 A**

**US 4687089 A**

(58) Field of Search

**UK CL (Edition T ) G4X X1 X3 X5**

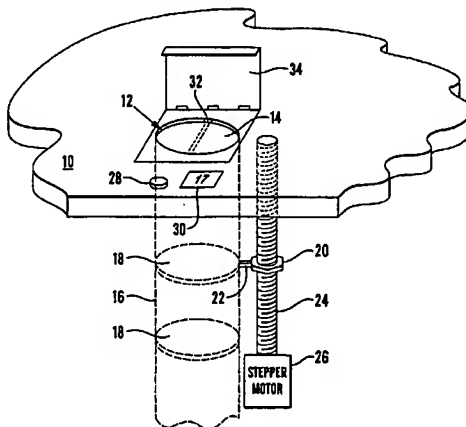
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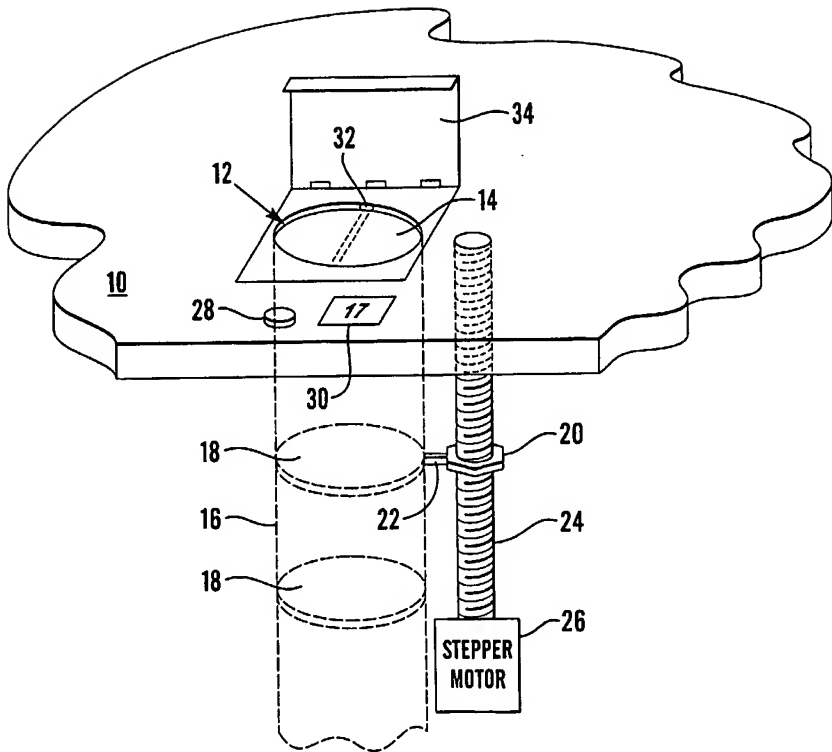
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(54) Abstract Title

**Teller coin dispensing apparatus**

(57) The coin dispensing device is intended to be incorporated into the work surface (10) of a bank cashier's desk. It provides a plurality of dispensing zones (12), each for a specific coin denomination. Each dispensing zone (12) has an aperture (14), depending from which there is a tubular coin holder (16). Reciprocably movable within each coin holder (16) is a coin support (18) which is driven by a stepper motor (26) under the control of a control unit which includes a coin release button (28) and a display (30). A coin sensor (32) can sense coins until one coin sub-flush of the surface. When it is desired to dispense coins, the coin release button (28) is pressed a number of times equivalent to the number of coins to be dispensed, with the display (30) showing the number of times the button (28) has been depressed. The control unit then activates stepper motor (26) to move the coin support (18) by a sufficient amount to dispense the required number of coins. Coins are thus reliably dispensed in a location for the cashier/teller which can reduce operating strain on the cashier/teller. The device is also capable of assessing the thickness of coins and counting the coins stored therein.





COIN DISPENSING APPARATUS

The present invention relates to coin dispensing apparatus for use, for example, in a bank or other institution where coins are handled regularly.

Currently, many financial institutions store their coins in drawers. This means that the cashiers are required to lean over to withdraw coins or twist to the side to withdraw coins, neither of which is ideal from a health and safety viewpoint. The ideal situation is for a cashier to have all the components presented to him or her.

The present invention seeks to provide improved dispensing of coins.

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According to an aspect of the present invention, there is provided coin dispensing apparatus including a dispensing surface, a coin housing depending from the dispensing surface, a coin support operable to move coins within the housing towards and/or away from the dispensing surface and control means for controlling the coin support.

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There is preferably provided a motor, advantageously a stepper motor, for moving the coin support.

The coin support is preferably designed to hold a specific coin diameter and/or shape and thus a particular denomination of coin.

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In the preferred embodiment, the control means includes input means for inputting a desired number of coins to be dispensed, the control means being operable upon such input to control movement of the coin support to dispense the chosen number of coins.

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The support means may also be movable in a direction to allow insertion of coins into the dispensing apparatus, preferably by motorised movement.

There is preferably provided coin counting means for counting the number of coins dispensed and/or inserted. The counting means may include a physical coin counter, a position sensor for indicating the position of the support means and hence the number of

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coins in the holder, or a motor position sensor for indicating the position or rotation of the motor and therefrom the position of the coin support.

Advantageously, there is provided sensing means able to sense the coin type on the basis of the thickness of a coin inserted in the coin support. The sensing means could, for example, sense stepper motor rotation.

It is envisaged in use that there would be provided a plurality of such dispensers, one for each coin denomination. In such a case, there would preferably be provided a single control means and one or more motors. A single motor could be operated by a suitable clutch mechanism.

The apparatus preferably provides for changing the coin support, for example to change the coins types to be held in the apparatus or for use when a particular coin is redesigned over time.

An embodiment of the present invention is described below, by way of example only, with reference to the accompanying drawing in which the sole Figure is a schematic diagram of an embodiment of dispensing device.

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Referring to the Figure, the embodiment of dispensing device is intended to be incorporated into the work surface of a bank cashier's desk, of a shop cash till or the like.

In the work surface 10 there are provided a plurality of dispensing zones 12 (only one being shown in the Figure), each for a specific coin denomination. Each dispensing zone 12 has an aperture 14, depending from which there is a tubular coin holder 16 (shown in dotted outline). In the preferred embodiment the tubular coin holder 16 is of a size and shape which corresponds to the size and shape of its associated coins.

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The coin holder 16 is preferably replaceable to allow different sizes and/or shapes of holders 16 to be provided, thereby allowing the assembly to cater for different sets of coin denominations and to allow for changes in coins, such as new coins and re-designs of existing coins.

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Reciprocally movable within each coin holder 16 there is a coin support 18 (shown in two positions in the Figure). A nut follower 20 is coupled to the coin support 18 by a strut 22 passing through, for example, a longitudinal slot in the tubular support 16. The nut follower 20 is carried on a screw shaft 24 which is rotated in either direction by a  
10 stepper motor 26. Any other suitable motor may be used.

A control unit (not shown) is coupled to the stepper motor 26 and to input and display means, which in the example shown includes a coin release button 28 and a display 30.

15 A coin sensor 32 is provided at the top of the aperture 14 and preferably can sense coins until one coin sub-flush of the surface.

Closure of the dispensing zone 12 is provided by a cover 34 which can be pivoted to an upright open position or dropped to a closed position. The cover 34 may be lockable for  
20 security purposes. In one embodiment, there is provided a single large cover which covers all the coin dispensers and can act as a work surface when closed.

In use of a basic embodiment, when it is desired to dispense a certain number of coins, the coin release button 28 is pressed a number of times equivalent to the number of coins  
25 to be dispensed, with the display 30 showing the number of times the button 28 has been depressed and therefore the number of coins which will be dispensed.

Once the desired number of coins has been selected, the control unit activates stepper motor 26 to move the coin support 18 by a sufficient amount to dispense the required  
30 number of coins. In the preferred embodiment, the sensor 32 is able to sense the coins

as they pass across it, thereby to provide feedback as to the number of coins actually dispensed. This feedback is then used to control the stepper motor 26.

At the end of the dispensing operation, it is envisaged, in this embodiment, that the last  
5 coin would be pushed just above the surface 10 so that it can be merely slid off the dispensing zone 12. In such an event, the next coin in the holder would actually have moved so as to be flush with the surface 10. Therefore, the stepper motor 26 is operated in the reverse direction to lower the coins in the holder 16 such that the uppermost coin is dropped so as to be sub-flush with the surface 10, preferably one coin sub-flush.

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Thus, the coin dispensing operation is physically simple and can reduce substantially the risk of strain on the cashier.

Of course, other embodiments can provide a more sophisticated input and display. As  
15 one example, the input could allow for entering the exact number of coins by a numeric keypad, for example, which would reduce the need to press button 28 many times. Similarly, the display 30 can display not only the number of coins selected to be dispensed but also other factors, such as the number of coins remaining in the dispenser and so on.

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In order to load coins into the system, this can be done simply by placing a coin in the aperture 14, which would cause the sensor 32 to detect a coin and as a consequence to cause control unit to activate the stepper motor 26 in a direction to lower the coin support 18 and thereby to "accept" the coin into the system.

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In the preferred embodiment, there is provided a coin sensor (possibly the coin sensor 32) designed to be able to sense the thickness of a coin being inserted into the dispenser. In this manner, it can be determined whether the coin is being placed in the correct holder 16. This, coupled to the feature of a coin holder 16 of specific diameter and  
30 shape, can provide reliable coin identification. In an embodiment such a coin sensor could sense the rotation of the stepper motor 26 caused by insertion of the coin.

Any other loading mechanism or structure could be, for example, to load a larger number of coins into the dispenser. With appropriate feedback provided at the stepper motor 26, in particular position feedback related to the rotation of the shaft 24, it would be possible to lower the coin support 18 and introduce a large number of coins all in one go until the coins reach a position in which they are flush with surface 10. This would provide double feedback: (1) from the position of the stepper motor 26 indicating the position of the holder 16 and hence the space capacity for coins within the holder 16 and (2) from the sensor 32 indicating that this space is full with coins and therefore that the expected number of coins in holder 16 has been achieved.

In order to prevent hunting of the system, it is envisaged that the stepper motor 26 would be operated in the reverse direction following a dispensing operation only after a certain time delay, for example ten seconds. Such a delay could be cancelled when it is known that the dispenser is being re-loaded with coins.

As an alternative to using the sensor 32 to sense the number of coins being dispensed, the motor 26 could be provided with a position sensing mechanism linked to the control unit, in which the thickness of the particular denomination of coins is known and is directly related by logic to the required amount of rotation of the stepper motor 26.

As explained above, although the Figure shows a single coin holder 16, it is envisaged that a plurality of coin holders 16 would be provided each for a specific denomination of coins. Therefore, each holder would have a specific dimension and would, preferably, be provided with an indication of the coin denomination at the work surface 10 for the assistance of the operator.

In an alternative embodiment, there is provided instead of stepper motor 26 a spring to bias the coin support 18 upwardly, with a latch or similar device at the dispensing zone 12 to keep coins in the dispenser until they are to be dispensed. In this connection, the control unit would release the latch to allow a coin to be dispensed.

CLAIMS

1. Coin dispensing apparatus including a dispensing surface, a coin housing  
5 depending from the dispensing surface, a coin support operable to move coins within the housing towards and/or away from the dispensing surface and control means for controlling the coin support.
2. Apparatus according to claim 1, wherein there is provided a motor for moving the  
10 coin support.
3. Apparatus according to claim 1 or 2, wherein the coin support is designed to  
a specific coin diameter and/or shape.
- 15 4. Apparatus according to claim 1, 2 or 3 wherein the control means includes input means for inputting a desired number of coins to be dispensed, the control means being operable upon such input to control movement of the coin support to dispense the chosen number of coins.
- 20 5. Apparatus according to any preceding claim, wherein the support means is movable in a direction to allow insertion of coins into the dispensing apparatus.
6. Apparatus according to any preceding claim, including coin counting means for counting the number of coins dispensed and/or inserted.
- 25 7. Apparatus according to claim 6, wherein the counting means includes a physical coin counter, a position sensor for indicating the position of the support means and therefrom the number of coins in the holder, or a motor position sensor for indicating the position or rotation of the motor and therefrom the position of the coin support.



8. Apparatus according to any preceding claim, wherein there is provided sensing means able to sense the coin type on the basis of the thickness of a coin inserted in the coin support.
- 5 9. Apparatus according to any preceding claim, wherein the sensing means senses stepper motor rotation.
10. Apparatus according to any preceding claim, wherein the coin support is removable.
- 10 11. A coin dispensing system including apparatus according to any preceding claim, wherein there is provided a plurality of coin dispensers for different coin denominations and/or types.
- 15 12. A system according to claim 11, including a single control means and one or more motors.

Amended claims have been filed as follows

1. A work station including a work surface and a coin dispensing apparatus, the coin  
5 dispensing apparatus comprising a coin housing depending from the work surface, a coin  
support operable to move coins within the housing towards and/or away from the work  
surface so as to provide for dispensing of coins at the work surface and control means for  
controlling the coin support.
- 10 2. A work station according to claim 1, wherein there is provided a motor for  
moving the coin support.
3. A work station according to claim 1 or 2, wherein the coin support is designed to  
hold a specific coin diameter and/or shape.
- 15 4. A work station according to claim 1, 2 or 3 wherein the control means includes  
input means for inputting a desired number of coins to be dispensed, the control means  
being operable upon such input to control movement of the coin support to dispense the  
chosen number of coins.
- 20 5. A work station according to any preceding claim, wherein the support means is  
movable in a direction to allow insertion of coins into the dispensing apparatus.
6. A work station according to any preceding claim, including coin counting means  
25 for counting the number of coins dispensed and/or inserted.
7. A work station according to claim 6, wherein the counting means includes a  
physical coin counter, a position sensor for indicating the position of the support means  
and therefrom the number of coins in the holder, or a motor position sensor for  
30 indicating the position or rotation of the motor and therefrom the position of the coin  
support.

8. A work station according to any preceding claim, wherein there is provided sensing means able to sense the coin type on the basis of the thickness of a coin inserted in the coin support.

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9. A work station according to any preceding claim, wherein the sensing means senses stepper motor rotation.

10. A work station according to any preceding claim, wherein the coin support is removable.

11. A work station according to any preceding claim, wherein there is provided a plurality of coin dispensers for different coin denominations and/or types.

15 12. A work station according to claim 11, including a single control means and one or more motors.

13. A work station substantially as hereinbefore described with reference to and as illustrated in the accompanying drawing.

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Application No: GB 0119255.8  
Claims searched: 1 - 12

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Examiner: Robert Barrell  
Date of search: 18 January 2002

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.T): G4X ( X1, X3, X5), G4D (DBA)

Int CI (Ed.7): G07D (1/00, 1/02, 1/08) G07F (5/24)

Other: ONLINE: EPODOC, WPI, JAPIO

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2327795 A (MARS) - see Figs.	1 - 3, 5 - 9, 11 & 12.
X	GB 2278221 A (MARS) - see Figs.	1 - 3, 5 - 7, 10 - 12
X	WO 91/07734 (NSM) - see Figs 1, 2, & 12 & Abstract	1 - 6, 11 & 12
X	US 4687089 (WUERICH) Fig 1 & desc.	1 - 3, 5 - 7, 11 & 12

X Document indicating lack of novelty or inventive step  
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